but those on Inorganic Chemistry show no sign of any decline in popularity, and maintain their position almost unchallenged as the standard work on chemistry in the English language. It is not easy at the first attempt to discover what are the special qualities that give to Roscoe's book this attribute of perpetual youth and long-sustained utility, but the refusal of the author to sacrifice either clearness of exposition or scholarly writing in order to reduce the size of the treatise, or to overcrowd its pages with detail, has perhaps been one of the most important factors in securing these enviable attributes. Thus it is still possible to turn to the work for the detailed story of the investigation of the fixed or variable oxygen-content of the atmosphere, or of the composition of the distillate from hydrochloric acid, without finding that the narrative has been so abbreviated as to be valueless except as a guide to the original papers. The editors of successive editions must have exercised considerable restraint in order to allow a full account to be preserved of experiments which were becoming too old to be modern, but were still too modern to be classical.

In bringing out the new edition, Dr. Cain has been handicapped by the fact that he has no longer been able to refer his work to Roscoe himself for approval; but, having been associated with Roscoe in the preparation of the preceding edition, he has had special advantages in striving to preserve the character and style of the book, and has succeeded so well in his task that the later dates which now appear in the footnotes are the most conspicuous marks of modernity. Here and there a paragraph remains which shows signs of obsolescence, and in an occasional instance (*e.g.* the electrical method of making carbon disulphide) modern work has escaped notice; but the new edition is a worthy successor to those that have gone before, and will contribute its share to the long life of the treatise.

One fault which was formerly characteristic of Roscoe's "Chemistry" has almost disappeared in the new edition—namely, the conversion of classical apparatus into a modern form, without any indication in the text of the transformation that had been effected. Only one example of this curious process appears to have survived—namely, the introduction of a gas furnace with a row of Bunsen burners in the figure illustrating the experiments on the composition of air carried out by Dumas and Boussingault in 1841, although the joints of the apparatus are still shown with the original rubber bandages instead of rubber tubing. This last link with an old tradition will perhaps be broken when the time comes for a sixth edition to appear.

It is some satisfaction that the printing and paper show no sign of deterioration, so that the appearance of the book is as attractive as in former years. Roscoe's "Chemistry" has never stooped to the use of black type as a means of emphasis, nor to the use of smaller type for matter of less importance Even the conventional division of the text into chapters is missing. These features have given to the book a character of its own, which clearly appeals to the more scholarly type of reader, even if the student finds that he is obliged to read the book instead of skimming through it from one key-word to another. The student will still find, however, that he has in Roscoe the best available guide to the literature of inorganic chemistry, directing his attention to all the more important papers, and passing lightly over the mass of detail which has converted so many of the larger works from text-books into dictionaries. Roscoe's "Chemistry," in spite of its increasing size, still possesses all the essential qualities of a book rather than of a catalogue, and this is perhaps the principal reason why its approaching jubilee is unaccompanied by any marks of old age.

T. M. L.

Archimedes.

Archimedes. By Sir Thomas Heath. Pp. ii + 58. (Pioneers of Progress Series.) (London: S.P.C.K.; New York: The Macmillan Co., 1920.) Price 2*s.* net.

BY the general consent of all competent judges Archimedes is one of the greatest mathematicians the world has ever seen. It is not easy to justify this opinion to a popular audience, most members of which know little and care less about mathematics; but Sir Thomas Heath's book ought to succeed in making the ordinary reader understand to some extent the nature of Archimedes' discoveries, and in arousing interest in the achievements of Greek mathematicians.

Chap. i. gives such fragmentary (and often legendary) notes as we have on Archimedes' personal career; chap. ii. is an excellent account of Greek geometry before Archimedes' time; chaps. iii.–vii. give analyses of Archimedes' extant works. Special attention may be directed to the paragraphs (pp. 31–35) on the "Method," discovered by J. L. Heiberg so lately as 1906 in a palimpsest at Constantinople. This work shows how Archimedes was led to some of his theorems by quasi-mechanical considerations. It should be

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observed that Archimedes does not give a so-called "statical proof" of any purely geometrical theorem; this would be contrary to Greek ideas of mathematical propriety. But the theorem having suggested itself as probable from mechanical (or other) considerations, strict methods were applied to test it—such, for instance, as the process of "exhaustion." In connection with this exhaustion method it is properly pointed out that the Greeks virtually laid the foundations of the integral calculus, much in the same way as Apollonius, in his "Conics," virtually anticipates the results of modern analytical geometry.

Scattered about the book there are numerous references to Greek discoveries and speculations which are not so well known as they ought to be. Thus Archimedes determined the angular diameter of the sun to a comparatively close degree of accuracy (p. 47); Aristarchus of Samos enunciated the Copernican hypothesis (p. 46); and, of course, all mathematicians of the time assumed the earth to be a sphere, and had a very fair idea of its dimensions.

The book is well printed and attractive in appearance; it is adorned by a frontispiece which is a reduced facsimile of that in Torelli's edition of Archimedes' works. The original is a good example of eighteenth-century copper-plate—amusing in one respect, because, although the landscape is put into proper perspective, two mathematical diagrams supposed to be drawn on the sand are drawn in their proper shape in the plane of the paper. The process reproduction appears to be very satisfactory, considering the amount of reduction involved. G. B. M.

Australian Meteorology.

Australian Meteorology: A Text-book, including Sections on Aviation and Climatology. By Dr. Griffith Taylor. Pp. xi+312. (Oxford: At the Clarendon Press, 1920.) Price 12*s*. 6*d*. net.

THIS text-book of meteorology is written for readers in the southern hemisphere, where, as the author truly points out, European and American text-books are to some extent inapplicable by reason of the fundamental difference in the wind circulation around centres of high and low pressure in the two hemispheres. The examples introduced for purposes of illustration in the present work are mainly drawn from Australian conditions, though the author's wide knowledge of world climatology is also freely used. The 300 or so pages of the book are divided into twenty-six chapters, which cover the practical work at observing stations, as well as the more theoretical aspects of dynamical meteorology and climatology. The author has achieved his object in producing a work which will give the reader of fair intelligence, but without advanced knowledge of mathematics or physics, a good general grounding in the subject. In this connection the pages devoted to pressure gradient and Ferrel's law may be particularly commended. One or two parts are less satisfactory, and in particular the reviewer suggests that in a future edition the chapter devoted to upper-air research might be recast, giving less space to the methods employed, and more to the very important results which have been obtained during the past few years in this field. At the same time, a little more attention might be devoted throughout the book to defining the technical terms used, and to explaining in more detail a few of the less obvious types of diagram, which do not at first glance convey much meaning to the unaccustomed reader.

In chap. xviii. a novel theory is put forward to account for the origin of the tropical lows which form over Australia and drift away to the south-eastward. The theory postulates that domes of warm ascending air are formed over the hottest inland regions in summer, and that the upper north-westerly current, striking these fixed domes, forms gigantic eddies which pass away to the south-eastward, being marked at the surface by a low-pressure centre and often by falls of rain. Any theory of the formation of depressions will be received with interest. The one here put forward is certainly not lacking in originality. It is surprising to learn that the words "backing" and "veering" are used in Australia in the sense of turning against and with the sun respectively instead of with the meanings counter-clockwise and clockwise as recommended by the International Meteorological Committee in 1905. In a modern text-book of meteorology one misses any reference to G. I. Taylor's eddy conductivity. In dealing with the diurnal change of wind at the surface and in the lower layers the simple convection theory of Espy is referred to, but no reference is made to the more complete explanation put forward by G. I. Taylor, in which the observed facts are well accounted for on the reasonable assumption of a diurnal variation of "K."

In his preface the author offers a half apology for the roughness of the diagrams with which the book is illustrated, but this seems scarcely necessary, as the numerous figures form one of its most valuable features, being mainly of small size, and yet showing just the details required to illustrate the point under discussion. J. S. D.

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